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REMARKS/ARGUMENTS

Applicant would like to thank the Examiner for the careful consideration given the present application. The application has been carefully reviewed in light of the Office action, and amended as necessary to more clearly and particularly describe the subject matter which applicant regards as the invention.

The drawings were objected to and have been amended appropriately herein to obviate the objection.

Claims 25 and 26 were objected to for informalities. The claims have been appropriately amended to overcome the objection.

Claims 20 through 22 were rejected under 35 U.S.C. 112, second paragraph, for lack of antecedent basis. The claims have been appropriately amended to overcome the rejection.

The Examiner has rejected claims 8, 9, and 11-28 of the present application in view of the following citations under 35 U.S.C. 103 (a).

Citation 1: US 6,627,144B1 (PCT Pub. No. WO98,59526), Suda et al.

Citation 2: DE 4,438,780A1

Citation 3: JP 54-56790 (USHIO INC, Heater lamp)

Citation 4: US 3,127,112 McCammon et al.

Citation 5: GB 2133259

Citation 6: US 6,014,164 Hofius, Sr. et al.

Citation 7: US 5,628,859 Jannin et al.

Citation 8: US 6,057,532 Dexter et al.

For the following reasons, the rejections are respectfully traversed.

None of the citations 1 to 8 above teaches or suggests “a heating element which is formed of a carbon-based substance including crystallized carbon, a resistance value adjustment substance and amorphous carbon” and “a lead wire having a spring portion which pulls the both ends of said

heating element at a predetermined tension” as required by amended claims 8, 17 and 25-28. The claims have been amended by incorporating these features to better distinguish from the cited references.

The heating element of the present invention is formed of a carbon-based substance including crystallized carbon, a resistance value adjustment substance and amorphous carbon. The amorphous carbon is served to bond the crystallized carbon such as graphite and the resistance value adjustment substance, thereby increasing the strength of the heating element. The heating element of the present invention, in particular, is thin-plate shaped having the width five times more the thickness, achieving more effective heating. Further, the amorphous carbon included in the heating element allows the characteristics (strength, heating characteristics, etc.) of the heating element to be set at desired values by changing the amount or sintering temperature of the amorphous.

Moreover, the heating element of the present invention has spring portions formed on both end portions thereof that pull the heating element at a predetermined tension. In the infrared ray lamp of the present invention, the spring portions absorb the expansion of the heating element due to the rise in temperature, and prevent the heating element from warping downward in the glass tube. Configured as such, in the present invention, the heating element will not warp downward due to thermal expansion and will not touch the glass tube. In addition, the spring portion formed to have a larger diameter than the width of the heating element can serve as a guide of the heating element in the manufacturing process, thus surely preventing the heating element from touching the glass tube. As a result, in the infrared ray lamp of the present invention, there may be observed no breaking of wire due to abnormal heating resulted from the touch of the heating element to the glass tube.

Further, the infrared ray lamp of the present invention is provided with spring portions so that the chock or vibration to be exerted on the infrared ray lamp can be absorbed in the spring

portions. Thus, the possibility is drastically decreased in the present invention that the infrared ray lamp may become defective due to shock or vibration when assembled into the product, delivered, or used, thereby making it possible to provide a long-life infrared ray lamp having stable characteristics. Since every limitation of the claims is not taught or suggested by the cited references, claims 8, 17 and 25-28 are patentable over the prior art of record. Dependent claims 9, 11-16 and 18-24 are patentable for the same reasons.

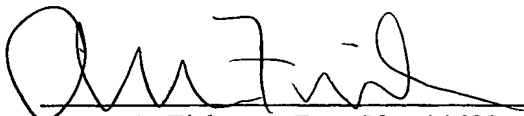
With respect to the double patenting rejection of claims 8, 9 and 11-28 in view of the inventions of the relevant US application (10/643,218; P24087-15), a terminal disclaimer is enclosed herewith to overcome the rejection.

In light of the foregoing, it is respectfully submitted that the present application is in a condition for allowance and notice to that effect is hereby requested. If it is determined that the application is not in a condition for allowance, the Examiner is invited to initiate a telephone interview with the undersigned attorney to expedite prosecution of the present application.

If there are any additional fees resulting from this communication, please charge same to our Deposit Account No. 16-0820, our Order No. 33476US1.

Respectfully submitted,

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Date: July 1, 2004



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FIG. 9

(a)

Fig. 9(a)

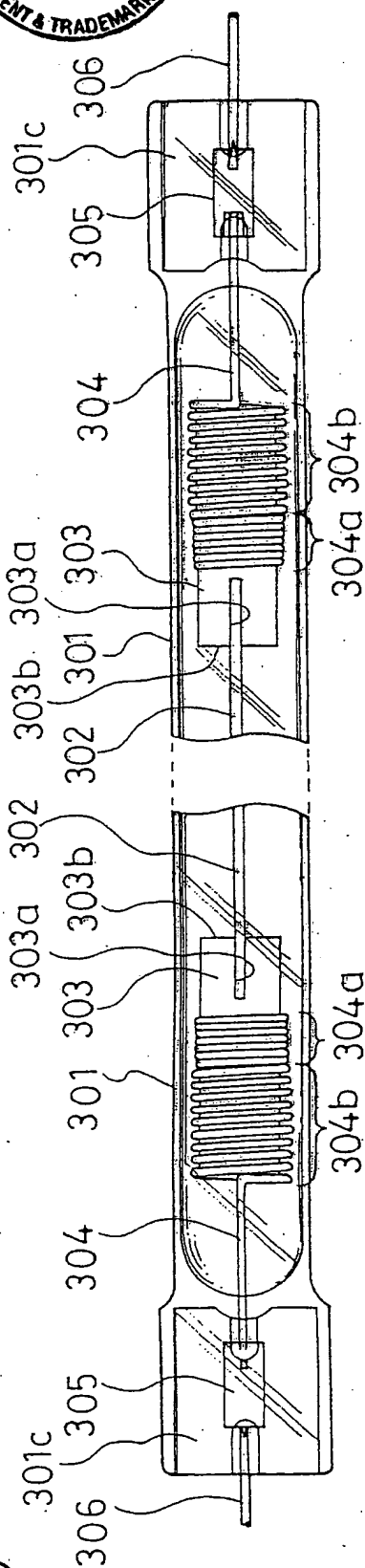
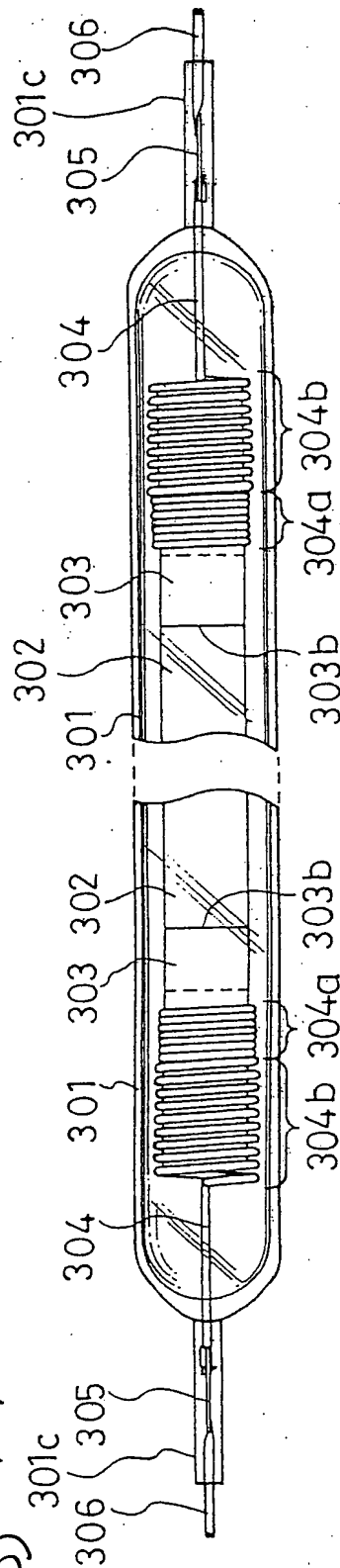


Fig. 9(b)

(b)

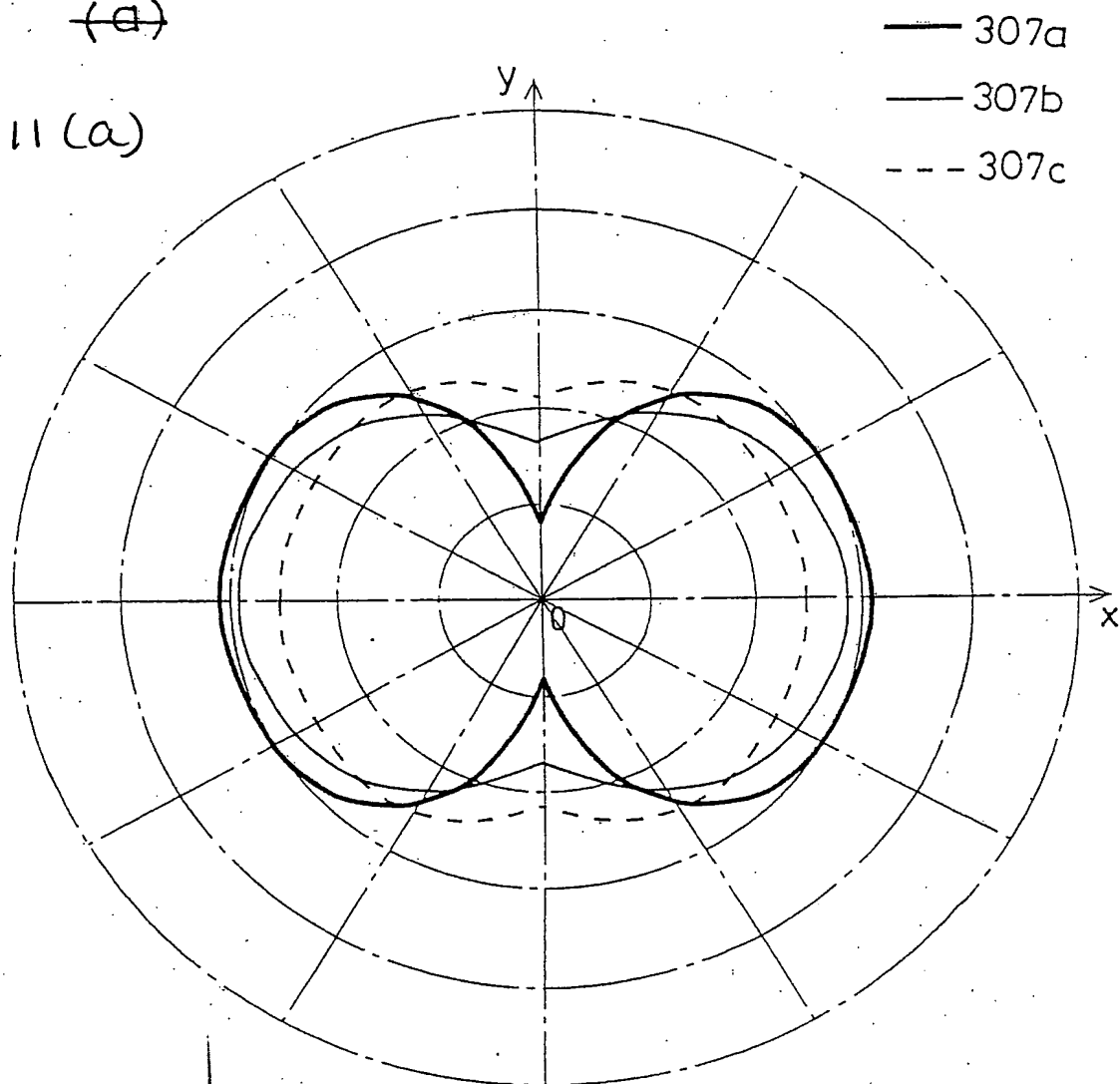


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~~FIG. 11~~

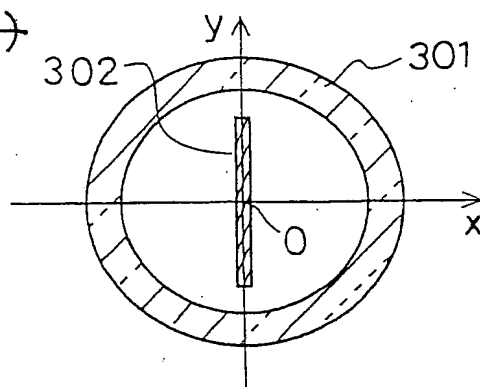
~~(a)~~

Fig. 11 (a)



~~(b)~~

Fig. 11 (b)



~~FIG. 12~~

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Fig. 12(a) (a)

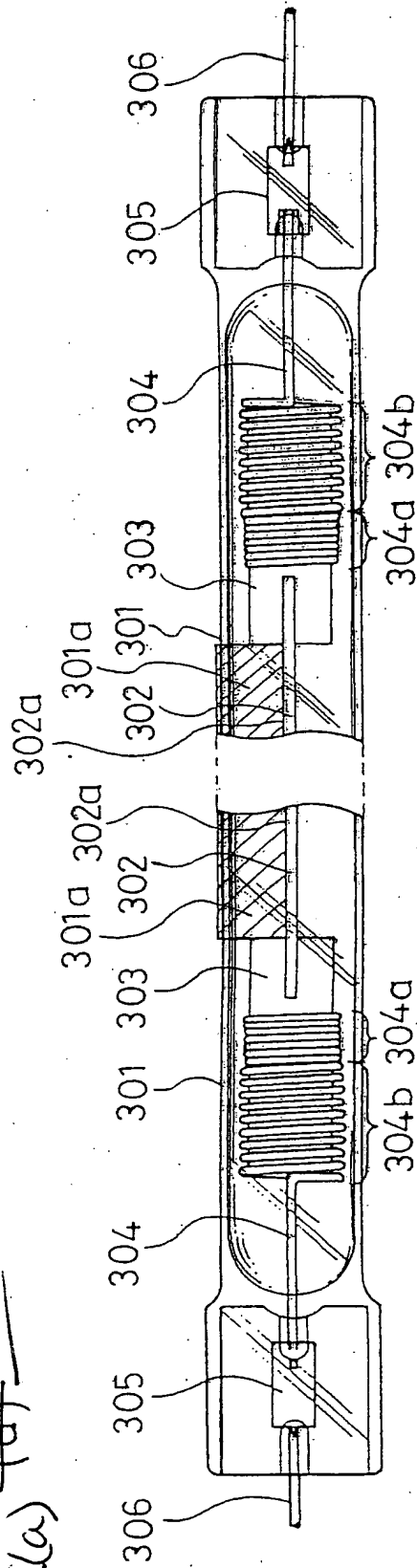
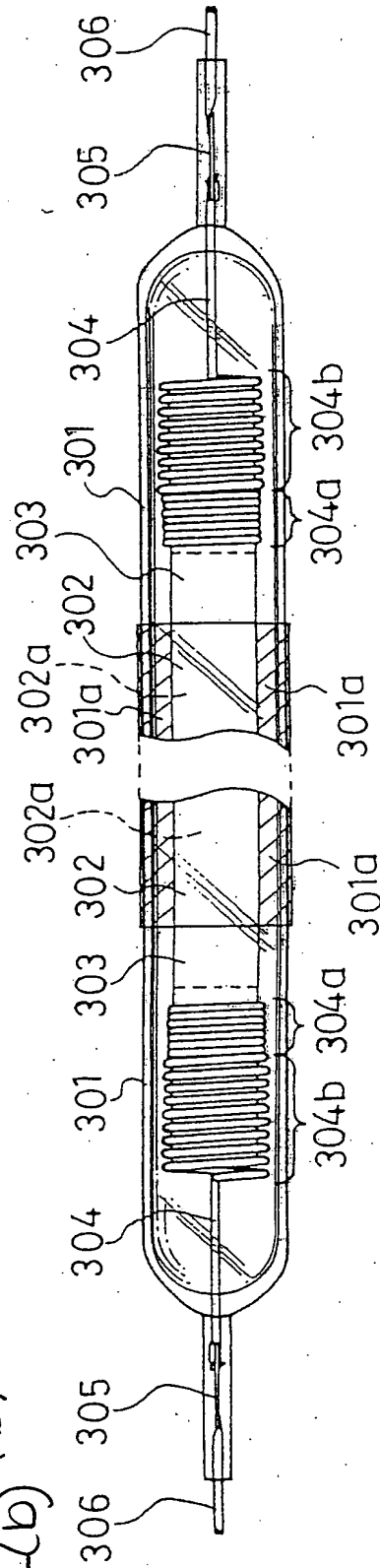


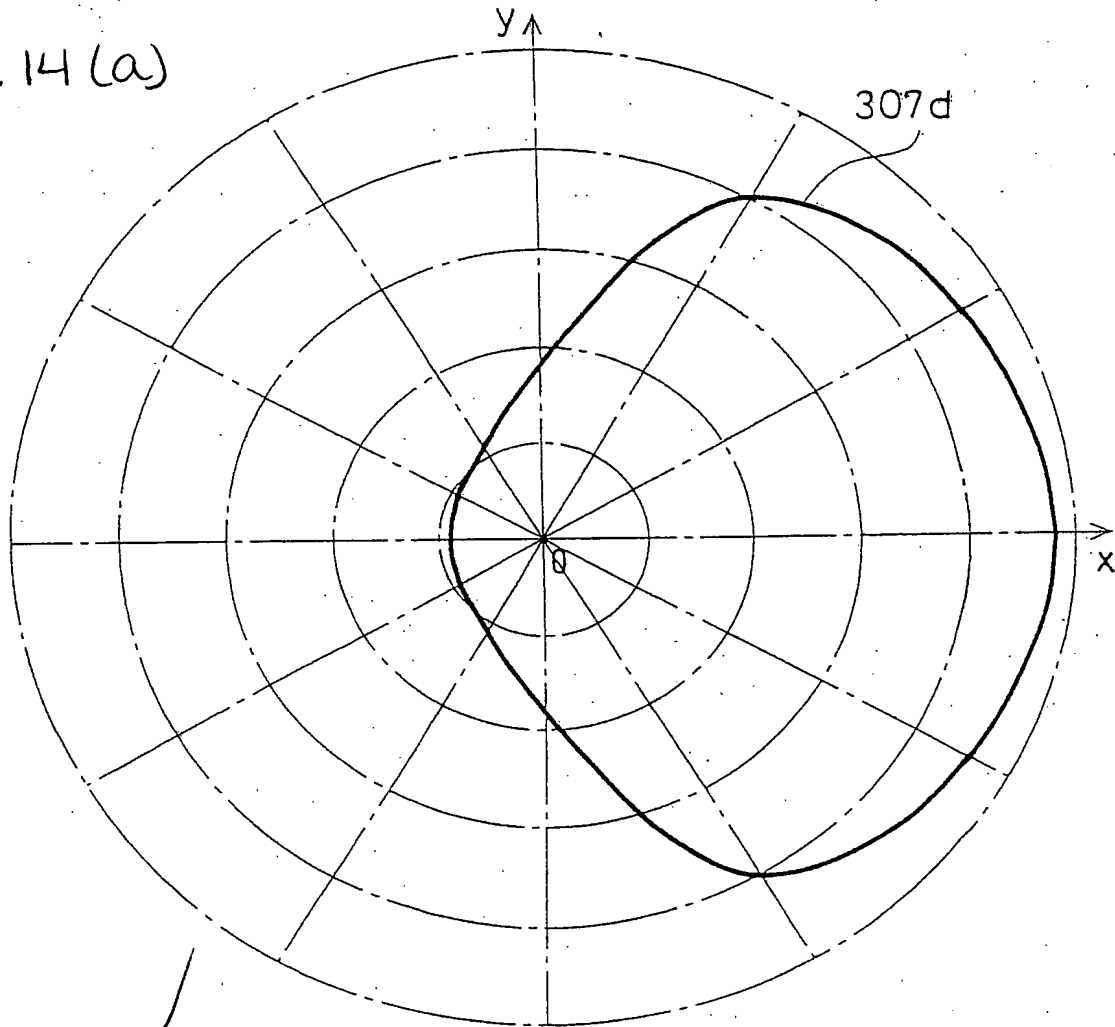
Fig. 12(b) (b)



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~~FIG. 14~~

~~(a)~~
Fig. 14(a)



~~(b)~~
Fig. 14(b)

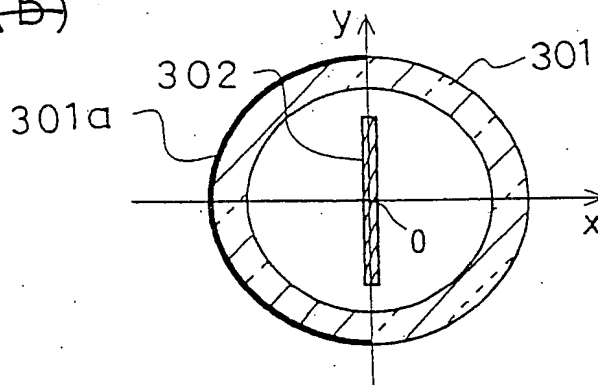
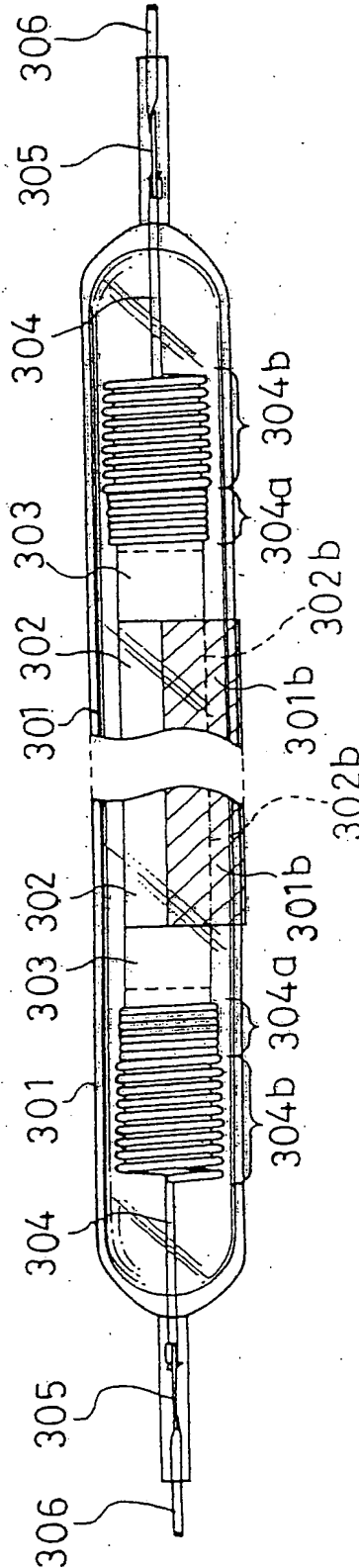
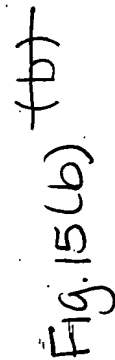


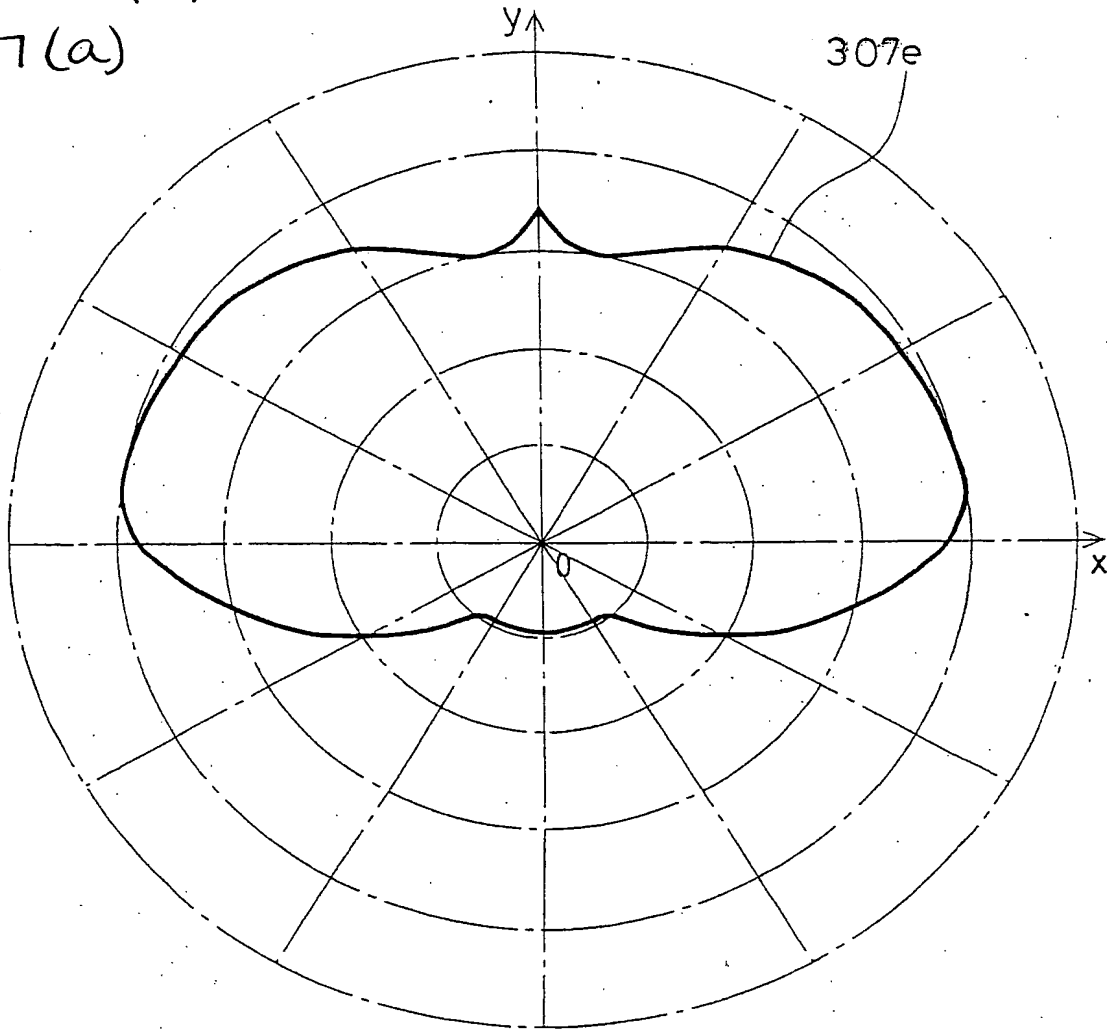
Fig. 15(a) ~~(a)~~



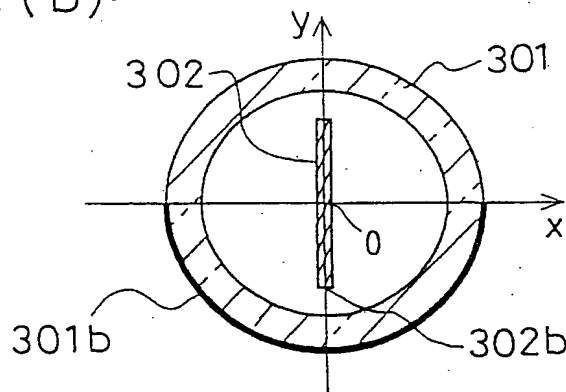
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~~FIG. 17~~

~~(a)~~
Fig. 17(a)



~~(b)~~
Fig. 17(b)



~~FIG. 20~~~~(a)~~

Fig. 20(a)
Prior Art

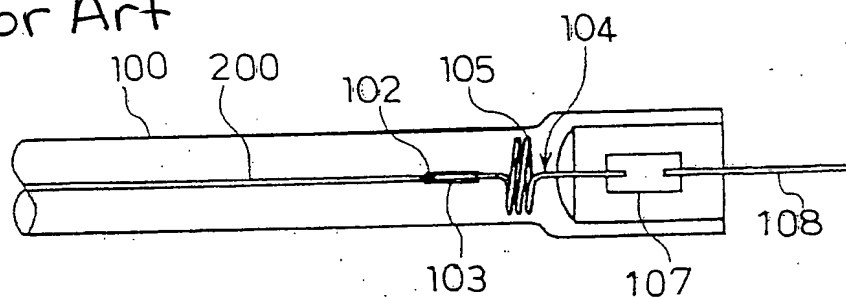
~~(b)~~

Fig. 20(b)
Prior Art

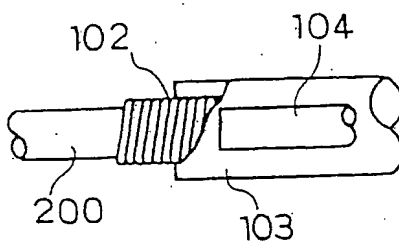


FIG. 21

Prior Art

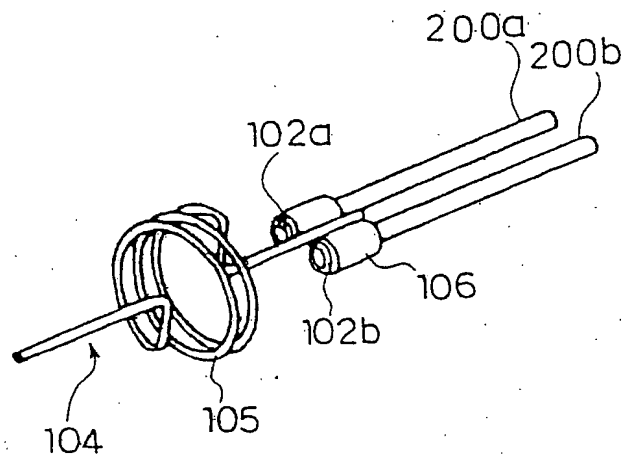


FIG. 22
Prior Art

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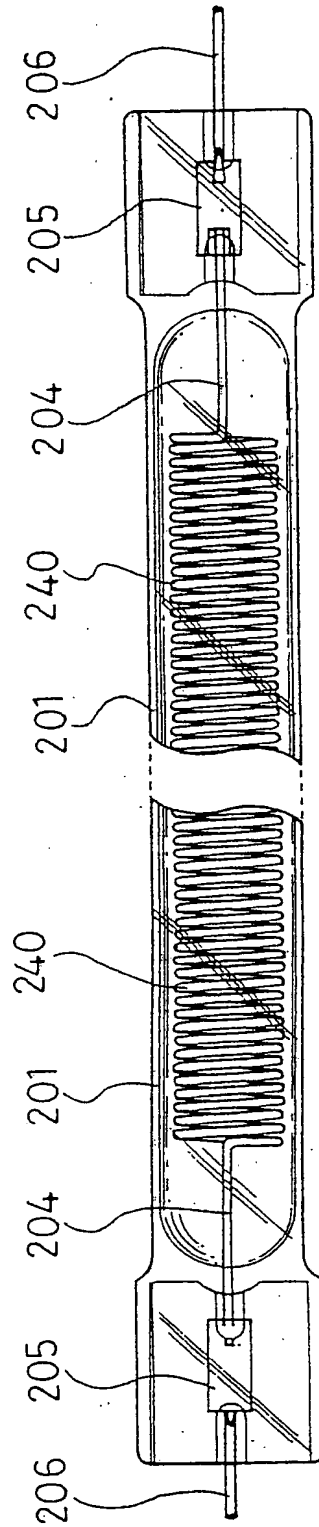
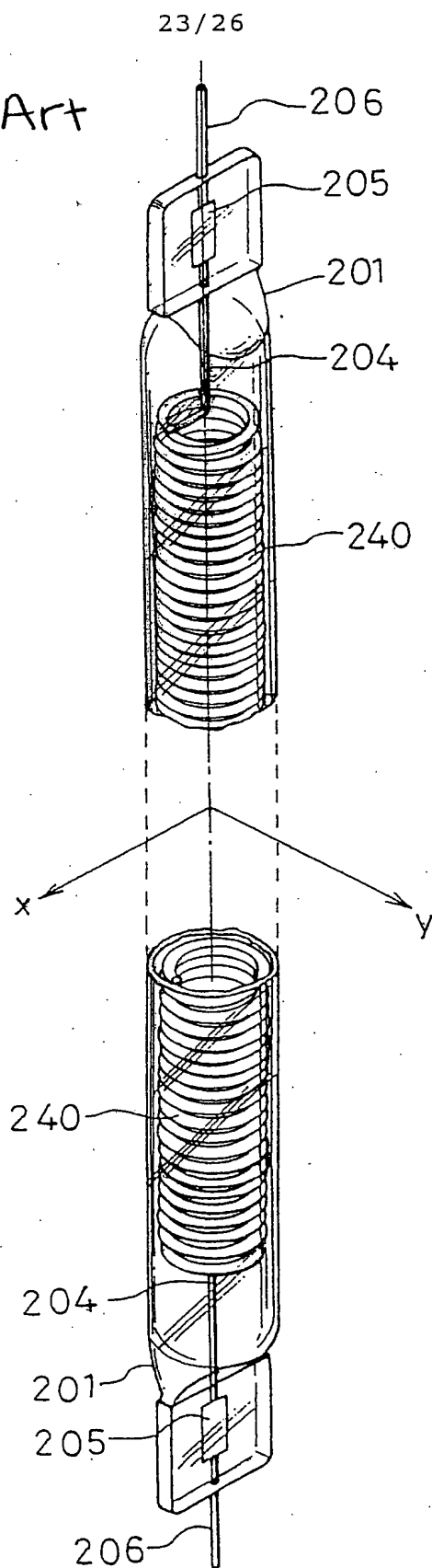


FIG. 23
Prior Art

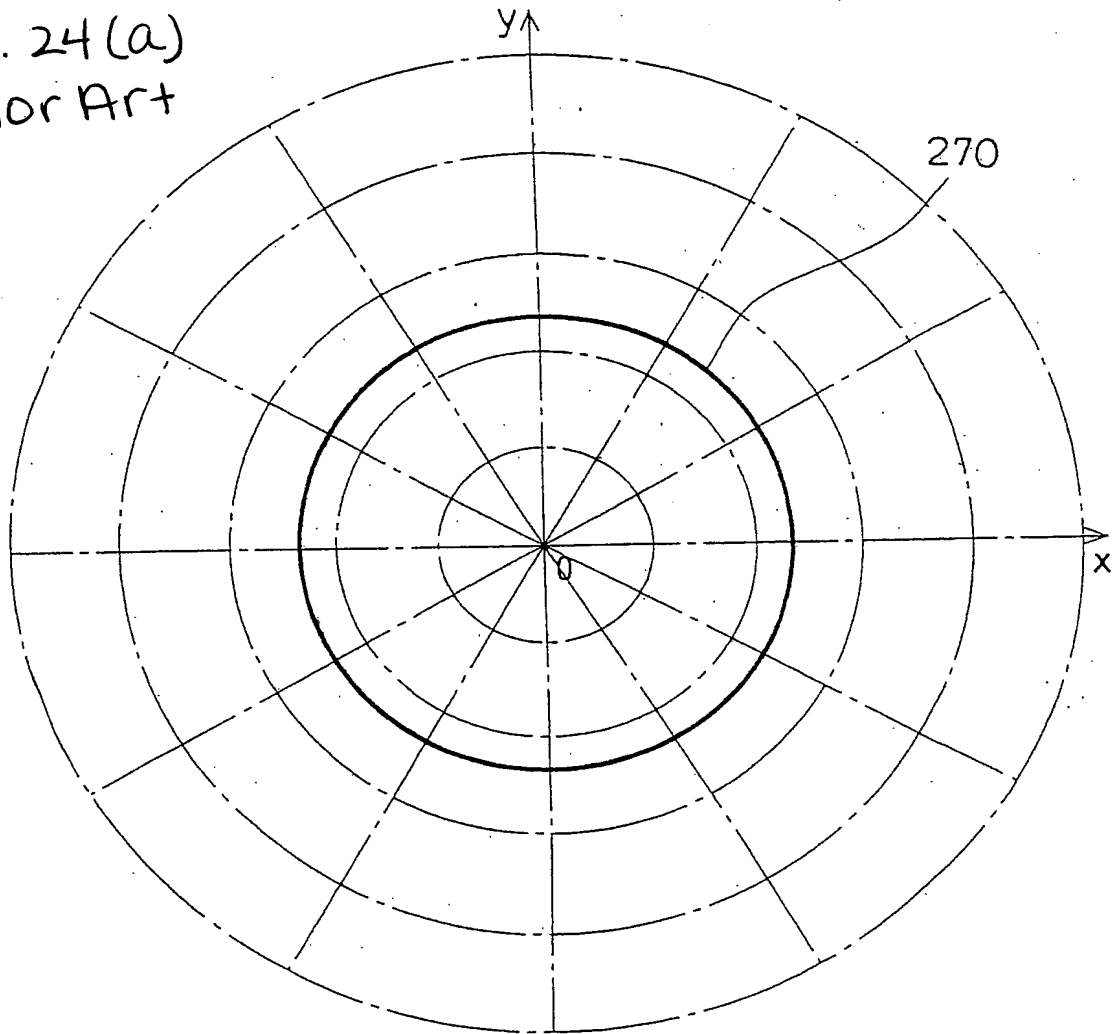


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~~FIG. 24~~

(a)

Fig. 24(a)
Prior Art



(b)

Fig. 24(b)
Prior Art

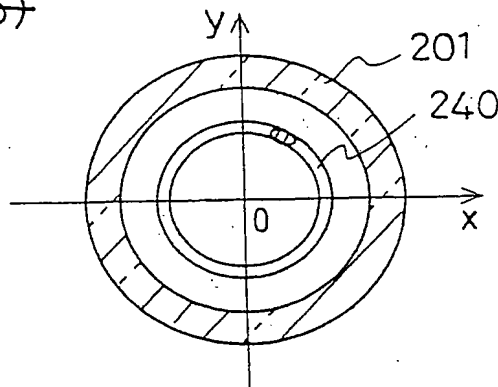
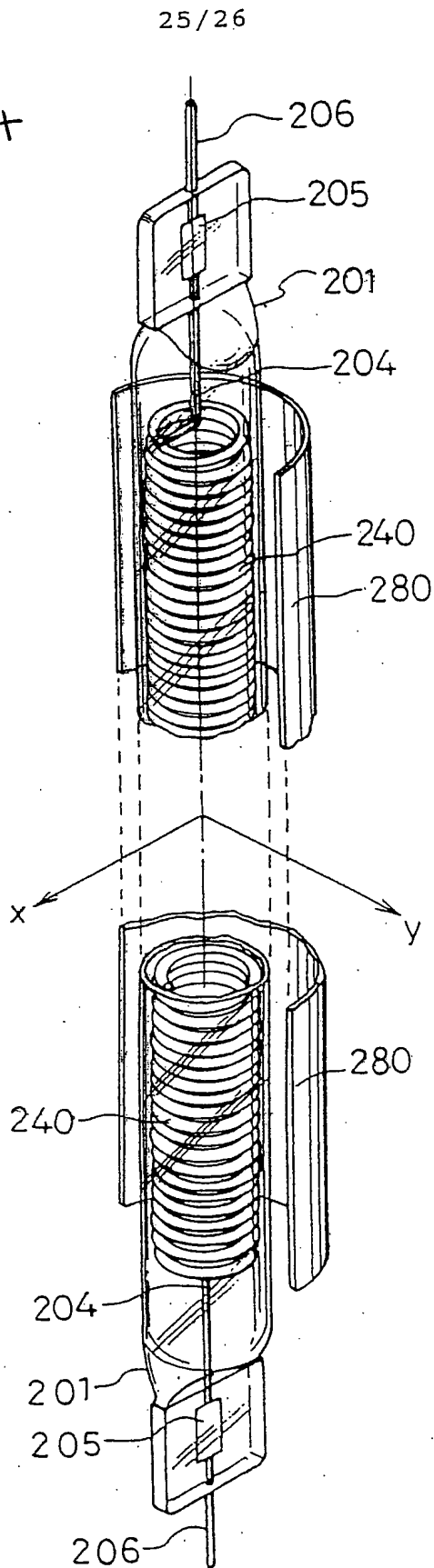


FIG. 25
Prior Art



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~~FIG. 26~~

Fig. 26(a)
Prior Art

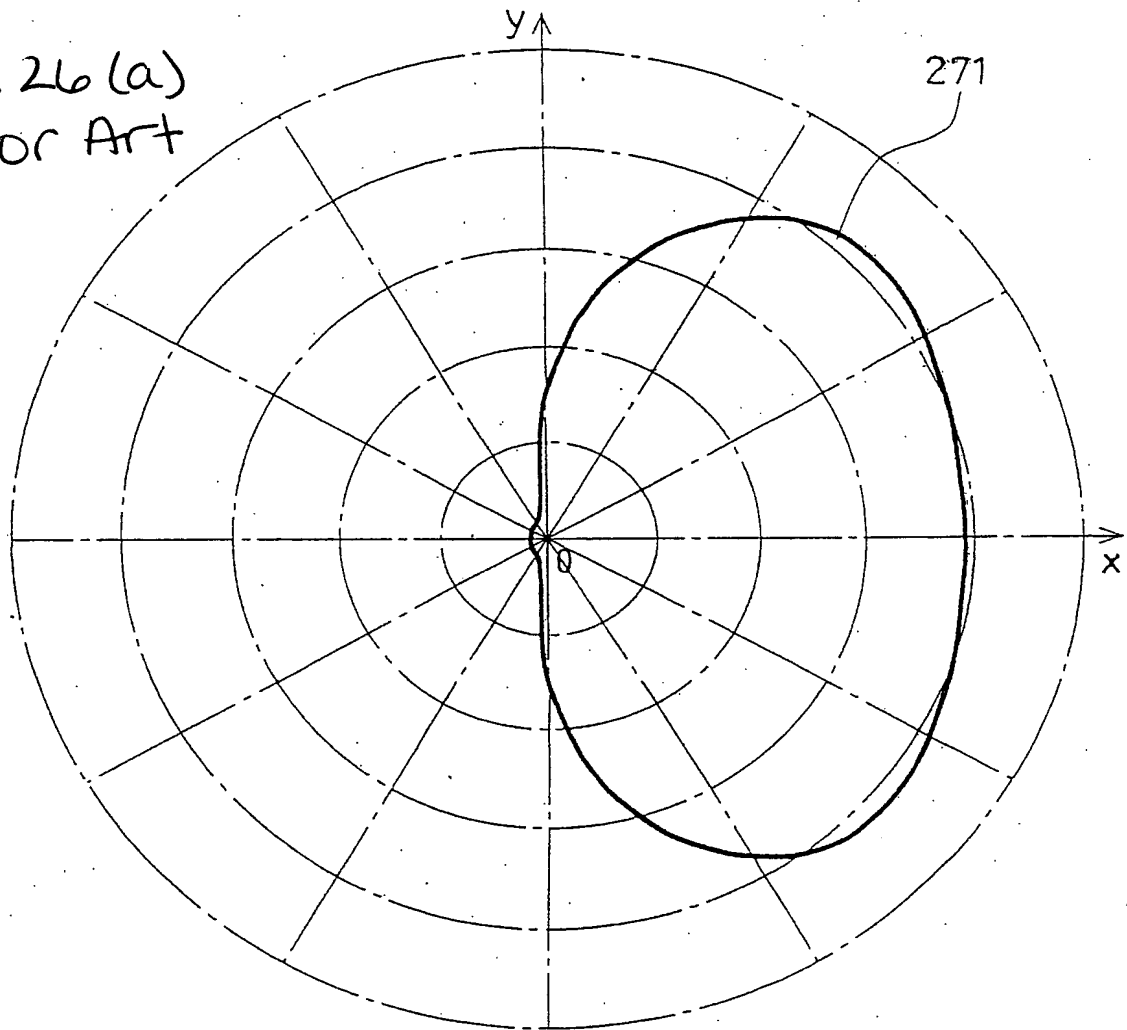


Fig. 26(b)
Prior Art

